Paper No. 27

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte TAKUYA IKEDA and MAKI KAMIKUBO

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Appeal No. 1997-2947
Application No. 08/352,079[1]

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HEARD: November 16, 2000

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Before PAK, WALTZ, and TIERNEY, Administrative Patent Judges.

TIERNEY, Administrative Patent Judge.

## *DECISION ON APPEAL*

This is an appeal under 35 U.S.C. §134 from the examiner's refusal to allow claims 6-8 and 11-12. We affirm.

### *The Invention*

The invention relates to a catalyst device for the purification of exhaust gas. More particularly, the catalyst device comprises a three-way catalyst A and an absorption catalyst B.

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[1] Application for patent filed December 1, 1994. This application claims priority to Japanese application 5-319,931 filed December 20, 1993.

The distance between catalyst A and adsorption catalyst B is preferably within a range of from 10 to 50 mm. (Specification, p. 7).

Independent claim 6 and dependent claim 7 are illustrative of the invention and read as follows:

> 6. A catalyst for the purification of exhaust gases which comprises:
> (a) a catalyst A comprising a honeycomb carrier and a three-way catalyst formed thereon for purifying hydrocarbons, carbon monoxide and nitrogen oxide in the vicinity of the theoretical air-fuel ratio; and
> (b) an adsorption catalyst B comprising a honeycomb carrier and a zeolite layer formed thereon for the effective adsorption of hydrocarbons, and wherein the absorption catalyst B is located adjacent to, and on the downstream side of the catalyst A in the direction of the flow exhaust gas and wherein the catalyst A and the absorption catalyst B are 10-50 mm apart.
>
> 7. A device for the purification of exhaust gases according to the claim 6, wherein the zeolite layer in the adsorption catalyst B is provided with a catalyst layer consisting essentially of a metal selected from the group consisting of platinum, palladium, rhodium, silver, copper, chromium, cobalt and neodymium as a catalyst component, and one or more of activated ceria and alumina.

*References*

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

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| Patil *et al*. (Patil) | 5,125,231 | Jun. 30, 1992 |
| Dunne | 5,142,864 | Sep. 1, 1992 |
| Abe *et al*. (Abe) | EP 485,179 | May 13, 1992 |

Patil, Dunne and Abe are available as prior art under 35 U.S.C. § 102(b).

*The Rejections*

(1) Claims 6-8 and 11-12 stand rejected under 35 U.S.C. § 112, second paragraph.

(2) Claims 6-7 and 11-12 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Patil or Dunne.

(3) Claim 8 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Patil or Dunne in view of Abe.

(4) Claims 6-8 and 11-12 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Abe.

*Findings of Fact*

*The Patil Reference*

Patil describes an engine exhaust system designed to reduce hydrocarbon emissions. (Col. 1, lines 6-7). More particularly, the system addresses the pollution problems associated with engine start-up, when, because traditional catalytic systems have not yet reached an efficient operating temperature, hydrocarbon gases are discharged by the exhaust system. (Col. 1, lines 8-13). Generally, the catalysts used in catalytic converter systems are inefficient or inactive at ambient temperature and must reach temperatures in the range of 300 to 400 $^{o}$C before they are activated. (Col. 1, lines 29-32).

Patil's invention provides an engine exhaust system having two catalytic converters, A & B. (Col. 2, lines 31-43). In many cases, the first converter A comprises a three-way converter

having noble metal catalysts. (Col. 4, lines 60-64). The three-way converter can be deposited onto an underlying ceramic substance, such as a high surface area material. (Col. 5, lines 9-46). The second catalytic converter B is a catalyzed molecular sieve system having a molecular sieve, a catalyst and at least one porous oxide of high surface area. (Col. 5, lines 47-53). The molecular sieves are those which are capable of adsorbing and desorbing hydrocarbons. (Col. 5, lines 63-65). A suitable molecular sieve is a zeolite which is coated onto a honeycomb substrate. (Col. 6, lines 50-67).

The relative placement of the two catalytic converters is a basic design feature of the Patil invention. (Col. 10, lines 10-13). The two catalytic converters A & B are connected via two exhaust pipes. (Col. 9, line 64 to col. 10, line 1, Figure 1, parts **12** and **14**). Additionally, situated between the two catalytic converters is a thermostatically-controlled three-way valve. (Col. 10, lines 49-56). The valve can be programmed to divert a portion of the exhaust from converter A to a muffler. (Col. 11, lines 6-16).

*The Dunne Reference*

Dunne describes a process for minimizing hydrocarbon emissions from the exhaust streams of engines when the engines are first started. (Col. 3, lines 52-55). In order to achieve the simultaneous conversion of carbon monoxide, hydrocarbon and nitrogen oxide pollutants, it is known in the art to employ three component control catalysts, *i.e.*, three-way catalysts, in conjunction with air-to-fuel ratio control means which function in response to a feedback signal

from an oxygen sensor in the engine exhaust system. (Col. 1, lines 24-30). Unfortunately, three-way catalysts are not able to convert substantial amounts of the pollutants at low operating temperatures. (Col. 1, lines 30-34). In an effort to solve this problem, Dunne directs an engine exhaust gas stream during the cold start operation over a catalyst and then takes the gas stream discharged from the catalyst and flows it over the turbine side of a turbocharger. (Col. 2, lines 23-29). After flowing through the turbine, the exhaust stream is flowed over an adsorbent bed and then discharged to the atmosphere. (Col. 2, lines 29-31).

The adsorbent bed of Dunne can be in the form of an adsorbent which is deposited onto a carrier, preferably a honeycomb carrier. (Col. 7, lines 17-49). The adsorbent bed may optionally contain one or more catalytic metals, such as platinum and palladium, dispersed thereof. (Col. 8, lines 17-23). The catalytic metals are capable of oxidizing the hydrocarbon and carbon monoxide and reducing the nitric oxide to innocuous products. (Col. 8, lines 47-49). Thus, the adsorbent bed can act as both as an adsorbent and as a catalyst. (Col. 8, lines 49-51). It is preferable that the catalytic metal be present in an amount ranging from about 0.01 to about 4 weight percent of the adsorbent support. (Col. 8, lines 40-42).

*The Abe Reference*

Abe describes a catalytic converter for the purification of automobile exhaust in which a heater is provided to raise the temperature of the catalytic converter during the start-up of the automobile. (Page 3, lines 5-19). More particularly, Abe discloses a catalytic converter

comprising: 1) a zeolite adsorbent which may contain a catalyst supported thereon; 2) a heater having a honeycomb structure which may contain an adsorbent or adsorbent-catalyst composition coated on the honeycomb structure; and, 3) at least one monolith catalyst. (Page 3, lines 5-19 and page 5, lines 28-31).

The zeolite adsorbent (1) may employ any structure, however, a honeycomb structure is preferable in view of potential pressure loss. (Page 8, lines 34-35). As mentioned above, the zeolite adsorbent (1) may contain a catalyst, such as platinum, supported thereon. (Page 5, lines 8-11 and Example 3). The heater adsorbent-catalyst (2) having a honeycomb structure is preferably formed from a zeolite adsorbent and a noble metal catalyst, such as platinum, palladium or the like. (Page 6, lines 9-10). Additionally, the heater adsorbent-catalyst (2) can function as a three-way catalyst when rare earth metal oxides and/or alkaline earth metal oxides are added to the adsorbent zeolite. (Page 6, lines 34-37). The main monolith catalyst (3) is preferably a three-way catalyst which may be supported on a ceramic honeycomb structure. (Page 8, lines 32-33 and Example 1).

The zeolite adsorbent (1), heater adsorbent-catalyst (2) and the monolith catalyst (3) may be employed in a variety of configurations. Preferable configurations includes those depicted in Figures 1(a) to 1(f). (Page 5, lines 28-31). According to Abe, Figures 1(c) to 1(f), where the monolith catalyst (3) is placed upstream, are preferable because the zeolite adsorbent-catalyst (1) and the catalyst on the heater adsorbent-catalyst (2) are resistant to deactivation and have excellent durability. (Page 5, lines 41-45).

Abe provides several examples of the catalytic converter. For instance, Example 1 describes the formation of an adsorbent heater where a honeycomb structure is coated with adsorbent zeolite. This adsorbent heater was then placed in front of a monolith catalyst which was a commercially available three-way catalyst supported on a ceramic honeycomb structure. (Example 1). Additionally, while not explicitly stated, a zeolite adsorbent was present in Example 1 which was then replaced in Example 3 by a zeolite adsorbent-catalyst composition. (Examples 1 and 3). In Example 3 the zeolite adsorbent-catalyst was composed of zeolite, platinum and rhodium on a honeycomb carrier formed with $Al_2O_3CeO_2$.[2] (Example 3). In yet another example, the three-way catalyst of Examples 1 and 3 was provided upstream from the adsorbent-catalyst. (Example 5). Additionally, Examples 11 and 12 depict a catalytic converter where the three-way catalyst is placed upstream from the zeolite adsorbent-catalyst and heater. (Table 2, Examples 11 and 12).

*Claim Construction*

In order to determine the patentability of the claims, we must first construe the meaning of the claims. In interpreting the claim language, we look first to the intrinsic evidence of record, *i.e.*, the application itself, including the claims, the specification and the prosecution history. Within this intrinsic evidence, the appropriate starting point is always the language of the claims

[2] $CeO_2$ is also known as ceric oxide or ceria. $Al_2O_3$ is also known as aluminum oxide or alumina.

themselves. A claim term should be given its ordinary meaning unless the specification provides a special, different meaning or definition. There is a heavy presumption in favor of the ordinary meaning of claim language. As such, any special definition given to a word must be clearly defined in the specification. *Although the written description may aid in the proper construction of a claim term, limitations, examples or embodiments appearing only therein may not be read into the claims*. *Kraft Foods Inc. v. International Trading Co.*, 203 F.3d 1362, 1366, 53 USPQ2d 1814, 1817 (Fed. Cir. 2000). Additionally, in interpreting the claims during *ex parte* prosecution, we apply the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise may be afforded by written description contained in appellants' specification. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). Further, prior art references may be "indicative of what all those skilled in the art generally believe a certain term means . . . [and] can often help to demonstrate how a disputed term is used by those skilled in the art." *Vitronics Corp. v. Conceptronic, Inc*., 90 F.3d 1576, 1584, 39 USPQ2d 1573, 1578-79 (Fed. Cir. 1996).

As recited above, appellants' claimed invention relates to a catalyst for the purification of exhaust gases. The claimed catalyst comprises a catalyst A and an adsorption catalyst B. Catalyst A is said to comprise both a honeycomb carrier and a three-way catalyst formed thereon for "purifying the hydrocarbons, carbon monoxide and nitrogen oxide in the vicinity of the

theoretical air-fuel ratio."[3] (Claims 1 and 12). The specific meaning of the language used to define catalyst A is not readily apparent from the literal language of independent claims 1 and 12. Accordingly, the language of these independent claims invites a review of the specification in order to enlighten us as to the proper meaning of their claim terms.

*The Claim Construction for Catalyst A*

Appellants' claim a catalyst for the purification of exhaust gases having a catalyst A. Catalyst A is defined by claims 1 and 12 as having a three-way catalyst "for purifying hydrocarbons, carbon monoxide and nitrogen oxide." The literal interpretation of this language is absurd. Literally, the language would require that the catalyst A "purifies" the hydrocarbons, carbon monoxide and nitrogen oxide into a more refined form. Such an interpretation, however, is inconsistent with the purpose of a catalytic converter in which hydrocarbon, carbon monoxide and nitrogen oxide pollutants are ***converted*** into innocuous compounds prior to their release into the atmosphere. Indeed, the specification states that catalysts are widely used to purify exhaust gases from an internal engine by oxidizing carbon monoxide and hydrocarbon and reducing nitrogen oxide. (Specification, p. 1). Accordingly, both common sense and the specification lead us to conclude that catalyst A converts hydrocarbons, carbon monoxide and nitrogen oxide in order to reduce pollution rather than purify them.

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[3]We note that, at oral hearing, appellants' representative was unable to explain the meaning of this claim language.

Additionally, the language of claims 6 and 12 requires"purifying hydrocarbons, carbon monoxide and nitrogen oxide in vicinity of the theoretical air-fuel ratio." It is unclear what appellant means by the words "in the vicinity of the theoretical air-fuel ratio." The specification states that the purification performance by an automobile catalyst is most effective at the air-fuel ratio near to the theoretical air-fuel ratio of 14.6. (Specification, p. 2). The specification also states that an automobile can hold the air-fuel mixture at approximately the theoretical air-fuel ratio through the use of a feedback control which detects the oxygen concentration in the exhaust gas. (Specification, p. 2). Accordingly, the specification implies that an automobile catalyst is more efficient in purifying the exhaust gases "in the vicinity of the theoretical air-fuel ratio." Thus, we conclude that appellants' claim language requires that catalyst A *is capable of* converting the hydrocarbon, carbon monoxide and nitrogen oxide when operating under conditions that are in the vicinity of the theoretical air-to-fuel ratio.

*The Claim Construction for Adsorption Catalyst B*

Appellants' claim a catalyst for the purification of exhaust gases having an adsorption catalyst B. The examiner finds appellants' claimed adsorption catalyst confusing since "the adsorption catalyst does not recite a catalyst." (Examiner's Answer, pages 4 and 9). Yet, the examiner fails to recognize that the functional language of a claim is, of course, an additional limitation in the claim. See, *e.g.*, *Wright Med. Tech., Inc. v. Osteonics Corp.*, 122 F.3d 1440,

1443-44, 43 USPQ2d 1837, 1840 (Fed. Cir. 1997) (functional language analyzed as a claim limitation).

The language "adsorption catalyst" is clear and unambiguous functional language which means what is says. Specifically, the plain and ordinary meaning of an "adsorption catalyst" is a material having both adsorption properties and catalytic properties. No confusion can arise from such a functionally defined term.

The specification provides support for appellants' claimed adsorption catalyst having both adsorption and catalytic properties. In particular, the specification states:

> As the adsorption catalyst B, it is ***preferable that a catalyst layer*** formed by mixing powder composed mainly of activated ceria and/or alumina with at least one noble metal selected from the group consisting of platinum (Pt), palladium (Pd) and rhodium (Rh) as a catalyst component is provided onto [the] zeolite layer. (Specification, pages 4-5).

Thus it can be seen that the specification provides written description for a catalyst being present in the adsorption catalyst. The fact that appellants have not positively recited the presence of a specific catalyst "layer" does not render the claim term "adsorption catalyst" ambiguous or detract from its plain and ordinary meaning. Indeed, while the claim term "adsorption catalyst" requires the presence of a catalyst we cannot limit the term "adsorption catalyst" to require a "catalytic layer" as claim terms cannot be narrowed by reference to the written description or prosecution history unless the claim language invites reference to those sources. *Johnson Worldwide Assocs. v. Zebco Corp.*, 175 F.3d 985, 989-990, 50 USPQ2d 1607, 1610 (Fed. Cir. 1999). Moreover, it is improper to add an extraneous limitation to a claim, that is, a limitation

added wholly apart from any need to interpret what the patentee meant by particular words or phrases in the claim. *Renishaw PLC v. Marposs Societ a per Azioni*, 158 F.3d 1243, 1249, 48 USPQ2d 1117, 1121 (Fed. Cir. 1998).

Additionally, we note that appellants' use of the term "adsorption catalyst" is consistent with that of the prior art. Specifically, Abe uses the term "adsorbent-catalyst" to mean a material having both an adsorbent material, zeolite, and a catalytic material, such as a noble metal. Indeed, when Abe describes an adsorbent having a catalyst Abe employs the term "adsorbent catalyst" whereas when the adsorbent does not have a catalyst, Abe uses only the term "adsorbent." (Abe, Example 3).

Moreover, the examiner's construction of the term "adsorption catalyst B" as not requiring the presence of a catalyst would contravene public policy regarding the notice function of claim language. A claim demarcates the boundaries of the purported invention in order to provide notice to the examiners of what is to be examined during *ex parte* prosecution and to provide notice, once issued, to the public of the limits beyond which experimentation and invention are undertaken at the risk of infringement. See *Athletic Alternatives, Inc. v. Prince Manufacturing, Inc.*, 73 F.3d 1573, 1581, 37 USPQ2d 1365, 1372 (Fed. Cir. 1996). Thus to construe appellants' "adsorption catalyst" as not requiring a catalyst would undermine the fair notice function and grant unreasonable advantage to the appellants and disadvantages to others. Further, not only would such a claim construction eviscerate a clear and unambiguous claim term but it would encourage practitioners to draft applications that on their face claim an invention

having specific elements yet in actuality employ definitions in the specification that render the claimed elements superfluous.

*The 35 U.S.C. § 112, Second Paragraph, Rejection*

The examiner has rejected claims 6-8 and 11-12 under 35 U.S.C. § 112, second paragraph. According to the examiner the term "adsorption catalyst B" is unclear as it appears that the adsorption catalyst B lacks recitation of a catalyst layer and as such the claim is "incomplete and nonfunctional." (Examiner's Answer, p. 4).

At the outset, the proper standard for definiteness under 35 U.S.C. § 112, second paragraph, is whether a claim reasonably apprises those of skill in the art of its scope. See *In re Warmerdam*, 33 F.3d 1354, 1361, 31 USPQ2d 1754, 1759 (Fed. Cir. 1994); *Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd.*, 927 F.2d 1200, 1217, 18 USPQ2d 1016, 1030 (Fed. Cir. 1991). As discussed above, the claim term "adsorption catalyst B" is clear and unambiguous in its meaning. More particularly, the claim term apprises those of skill in the art that appellants have claimed a catalyst for the purification of exhaust gases having an adsorption catalyst B which has both adsorption properties and catalytic properties. Accordingly, we conclude that the appellants' claimed "adsorption catalyst B" reasonably apprises those of skill in the art of its scope.

*The Prior Art Rejections*

The examiner has made several prior art rejections under 35 U.S.C. § 103(a). Specifically, the examiner has rejected: 1) claims 6-7 and 11-12 as unpatentable over Patil or Dunne; 2) claim 8 as unpatentable over Patil or Dunne in view of Abe; and, 3) claims 6-8 and 11-12 as unpatentable over Abe.[4] Generally, the examiner has rejected the various claims in view of the references descriptions of catalytic converters having a three-way catalyst coated onto a honeycomb carrier and an adsorbent catalyst which is also formed on a honeycomb carrier. (Examiner's Answer, pages 6-8).

According to the examiner, the references fail to specifically describe appellants' claimed 10-50 mm distance between the three-way catalyst and the adsorbent catalyst. The examiner cites appellants' specification as teaching that the claimed distance is not a critical feature of the invention. From this, the examiner finds that it would have been obvious to one of ordinary skill in the art to employ appellants' claimed distance as the general conditions of the claims are disclosed in the prior art and it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235-236 (1955). (Examiner's Answer, pages 6 and 8).

[4]According to appellants', claims 6, 8, 11 and 12 stand or fall together and claim 7 stands or falls separately. Therefore, in accordance with the provisions of 37 CFR § 1.192(c)(7) (1996), and since appellants have presented specific, substantive reasons for the separate patentability of each group, we decide the grounds of rejection in this appeal on the basis of claims 6 and 7.

*Appellants' Appeal Brief and Reply Brief*

1. *The Rejection over Patil or Dunne*

Appellants' contend that both Patil and Dunne teach away from the claimed 10 to 50 mm distance between catalyst A and adsorption catalyst B. We concur.

It is well settled that "a prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." *In re Bell*, 991 F.2d 781, 782, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)). Any motivation to modify the prior art references must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed Cir. 1995); *In re Gorman*, 933 F.2d 982, 986-87, 18 USPQ2d 1885, 1888, (Fed. Cir. 1991)("When it is necessary to select elements of various teachings in order to form the claimed invention, we ascertain whether there is any suggestion or motivation in the prior art to make the selection made by the applicant. [Citations omitted] ... The extent to which such suggestion must be explicit in, or may be fairly inferred from, the references, is decided on the facts of each case in the light of the prior art and its relationship to the applicant's invention.").

Both Patil and Dunne are directed to catalytic converters having a three-way catalyst and a separate adsorption catalyst. The references are silent as to the exact distance between the three-way catalyst and the adsorption catalyst. Yet, both references are quite clear as to how the

catalytic converters are to be configured. Specifically, Patil requires that the two catalysts A and B are connected via two exhaust pipes with a thermostatically-controlled three-way valve situated between the two catalysts. (Patil, col. 9, line 64 to col. 10, line 1, col. 10, lines 49-56, and Figure 1, parts **12** and **14**). Similarly, Dunne describes directing an engine exhaust gas stream during a cold start operation over a catalyst, flowing it over the turbine side of a turbocharger and then over an adsorption catalyst. (Dunne, col. 2, lines 23-31). Accordingly, both Patil and Dunne require specific catalyst configurations having valves and turbines situated between the two catalysts and there is no suggestion in either reference for their removal. As such, neither reference would lead one skilled in the art to optimize the distance between the catalyst to a range of from 10 to 50 mm.

2. *The Rejections over Abe*

Appellants contend that Abe fails to describe the claimed gap of 10 to 50 mm between catalyst A and adsorption catalyst B. Moreover, appellants submit that "the claimed distance between catalysts A and B is not result effective and thus the distance would not be obvious to

optimize." (Appeal Brief, p. 7).[5] Further, appellants argue that optimization is not "routine" unless the prior art recognizes that the variable to be optimized is result effective.

Abe suggests that the distance between catalyst A and B is a result effective variable. At engine start-up, Abe describes passing electricity through a heater to:

> [H]eat the heater and simultaneously the HC's [hydrocarbons] captured by zeolite begin to be desorbed, and the main monolith catalyst and/or the catalyst supported on the heater, generally arranged downstream of the zeolite adsorbent is momentarily heated whereby the HC's are reacted and purified. (Abe, p. 5, lines 21-24).

Moreover, Abe is concerned about potential pressure loss occurring in the catalytic converter. (Abe, p. 8, lines 34-35). In addressing the heating of the catalyst and adsorbent by the heater and the potential for pressure loss, Abe places constraints on the respective placement of the catalyst and adsorbent. Thus, the catalyst and adsorbent of Abe must be placed at a distance from the heater which will allow each of them to be heated in a manner that allows for the conversion of the hydrocarbons. Furthermore, one skilled in the art reading Abe would avoid placing the respective catalyst, heater and adsorbent at distances which could detrimentally affect the

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[5]Contrary to appellants' assertions, appellants' specification describes the distance between the three-way catalyst and the adsorption catalyst as result effective. Specifically, while the specification states that the distance is not critical, the specification recognizes that:

> When the distance [between the catalyst and adsorption catalyst] is too near, there is a possibility of causing the degradation of engine performance due to the rise of back pressure, while when it is too apart from each other, the temperature of the catalyst located at the downstream side is not raised and there is a possibility of degrading the purification performance of the dropped-off HC. (Specification, page 6-7).

pressure within the converter. Accordingly, Abe suggests that the distance between the catalyst and the adsorption catalyst is a result effective variable.

Appellants contend that the catalyst layer of claim 7 provides improved and unexpected adsorption functions. Specifically, appellants state that it was not known until the present invention that the metal may be carried on the zeolite layer in order to improve the hydrocarbon adsorption performance of the zeolite layer. Yet, as noted above, Abe exemplifies a zeolite adsorbent composed of a honeycomb carrier having a coating of alumina and ceria on which platinum and rhodium were loaded by impregnation. (Abe, Example 3). Further, appellants have failed to cite any persuasive evidence of this alleged unexpected improvement in hydrocarbon adsorption. Failing to distinguish the teachings of Abe and/or present persuasive evidence of unexpected results, appellants have failed to overcome the examiner's *prima facie* case of obviousness.

We note that claim 8 is directed to the amount of metal carried on the zeolite layer of the adsorption catalyst. This claim was rejected as unpatentable Patil or Dunne in view of Abe. As discussed above, we affirm the rejection of claims 6-8 and 11-12 over Abe alone. As the adsorption catalyst teachings of Patil and Dunne are consistent with those of Abe, we affirm the rejection of claim 8 over Patil or Dunne in view of Abe.

*Conclusion*

For the reasons we set forth above, we affirm the examiner's rejection of claims 6-8 and 11-12 under 35 U.S.C. § 103(a) as unpatentable over Abe and additionally, the examiner's rejection of claim 8 as unpatentable over Patil or Dunne in view of Abe. Furthermore, we reverse the examiner's decision of the examiner to reject: (1) claims 6-8 and 11-12 under 35 U.S.C. § 112, second paragraph; and (2) claims 6-7 and 11-12 under 35 U.S.C. § 103(a) as unpatentable over Patil or Dunne. Accordingly, we affirm the decision of the examiner in rejecting the claims on appeal.

No period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

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|---|---|
| CHUNG K. PAK<br>Administrative Patent Judge | ) |
| THOMAS A. WALTZ<br>Administrative Patent Judge | ) BOARD OF PATENT<br>) APPEALS<br>) AND<br>) INTERFERENCES |
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